IN THE CLAIMS:

Please cancel claim 7, amend claims 1, 4, 9 and 10, and add new claim 13 as follows:

1. (Currently amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system, a silicon dioxide film and a resist pattern having been formed in order on the surface of the substrate;

introducing an etching gas composed of a fluorocarbon gas ~~alone~~ into the reaction chamber, wherein the fluorocarbon gas is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases; and

creating a plasma from the ~~fluorocarbon gas~~ etching gas and etching the silicon dioxide film with the plasma and using the resist pattern as a mask,

wherein a residence time τ of the fluorocarbon gas in the reaction chamber is controlled at a value greater than 0.1 sec and equal to or less than 1 sec, the residence time τ being given by $P \times V/Q$, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit: Pa · L/sec) of the fluorocarbon gas.

2. (Cancelled)

3. (Original) The plasma processing method of Claim 1, wherein the residence time τ is controlled by a mass flow controller provided for the plasma processing system and/or a valve and a pump provided for the plasma processing system.

4. (Currently amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system, a silicon dioxide film having been formed on the surface of the substrate;

introducing an etching gas composed of a fluorocarbon gas ~~alone~~ into the reaction chamber, wherein the fluorocarbon gas is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases; and

creating a plasma from the ~~fluorocarbon gas~~ etching gas and etching the silicon dioxide film with the plasma and using the resist pattern as a mask,

wherein P×W/Q is controlled at a value greater than $0.8\times10_4$ sec • W/m^3 and equal to or less than 8×10^4 sec • W/m^3, P×W/Q being a product of a residence time τ of the fluorocarbon gas in the reaction chamber and a power density Pi of power applied to create the plasma, the residence time τ being given by P×V/Q, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit: Pa · L/sec) of the fluorocarbon gas, the power density Pi being given by W_0/V, where W_0 is a magnitude (unit: W) of the power and V is the volume (unit: L) of the reaction chamber.

5. (Cancelled)

6. (Original) The plasma processing method of Claim 4, wherein the residence time τ is controlled by a mass flow controller provided for the plasma processing system and/or a valve and a pump provided for the plasma processing system.

Claims 7-8 (Cancelled)

9. (Currently amended) The plasma processing method of Claim ~~7~~ 13, wherein the residence time τ is controlled by a mass flow controller provided for the plasma processing system and/or a valve and a pump provided for the plasma processing system.

10. (Currently amended) A plasma processing method comprising the steps of:

placing a substrate inside a reaction chamber of a plasma processing system;

introducing a fluorocarbon gas into the reaction chamber, wherein the fluorocarbon gas is composed of at least one of C_4F_6 ~~and~~, C_5F_8 and C_6F_6 gases; and

creating a plasma from the fluorocarbon gas and depositing an organic film on the substrate using the plasma,

wherein P×W_0/Q is controlled at 0.8×10^4 sec • W/m^3 or less, P×W_0/Q being a product of a residence time τ of the fluorocarbon gas and a power density Pi of power

applied to create the plasma, the residence time τ being given by $P \times V/Q$, where P is a pressure (unit: Pa) of the fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit : Pa · L/sec of the fluorocarbon gas, the power density Pi being given by W_0/V, where W_0 is a magnitude (unit: W) of the power and V is 'the volume (unit: L) of the reaction chamber.

11. (Cancelled)

12. (Original) The plasma processing method of Claim 10, wherein the residence time τ is controlled by a mass flow controller provided for the plasma processing system and/or a valve and a pump provided for the plasma processing system.

Claims 13-18 (Cancelled)

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~~13~~. (New) A plasma processing method comprising the steps of:

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placing a substrate inside a reaction chamber of a plasma processing system, a silicon dioxide film having been formed on the surface of the substrate;

introducing a first fluorocarbon gas into the reaction chamber, wherein the first fluorocarbon gas is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases;

creating a first plasma from the first fluorocarbon gas and etching the silicon dioxide film with the first plasma;

introducing a second fluorocarbon gas into the reaction chamber, wherein the second fluorocarbon gas is composed of at least one of C_4F_6, C_5F_8, and C_6F_6 gases; and

creating a second plasma from the second fluorocarbon gas and depositing an organic film on the silicon dioxide film with the second plasma,

wherein a residence time τ of the first fluorocarbon gas in the reaction chamber is controlled at a value greater than 0.1 sec and equal to or less than 1 sec, the residence time τ being given $P \times V/Q$, where P is a pressure (unit: Pa) of the first fluorocarbon gas, V is a volume (unit: L) of the reaction chamber and Q is a flow rate (unit: Pa · L/sec) of the first fluorocarbon gas; and

wherein a residence time τ of the second fluorocarbon gas in the reaction chamber is controlled at a value equal to or less than 0.1 sec, the residence time τ being given by $P \times V/Q$.